

IN THE CLAIMS:

Please amend the claims as follows:

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Claim 1 (Currently Amended): An image processing method of creating output image data for obtaining a reproduced image by executing image processing on digital image data obtained by a digital camera, comprising:

a step of determining at first a density conversion condition for an image expressed by the digital image data, the density conversion condition being a first conversion function for density correction between the digital image data and the output image data to increase or decrease a density of a whole image by a predetermined value;

a step of determining next a gradation conversion condition for the image expressed by the digital image data on the basis of the density conversion condition, the gradation conversion condition being a second conversion function for the density correction and gradation correction between the digital image data and the output image data to control gradations in a predetermined range of the density of the image; and

a step of modifying the digital image data on the basis of the density conversion condition and the gradation conversion condition, thereby creating the output image data for obtaining the reproduced image.

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Claim 2 (Currently Amended): An image processing method of creating output image data for obtaining a reproduced image by executing image processing on digital image data obtained by a digital camera, comprising:

a step of separating the digital image data into density component data and color component data;

a step of determining a density conversion condition for converting a density of the density component data, the density conversion condition being a first conversion function for density correction between the density component data and a modified density component data to increase or decrease a density of a whole image by a predetermined value;

a step of determining a gradation conversion condition for converting a gradation of the digital image data on the basis of the density conversion condition, the gradation conversion condition being a second conversion function for the density correction and gradation correction between the density component data and the modified density component data to control gradations in a predetermined range of the density of the image;

a step of modifying the density component data in accordance with the density conversion condition and the gradation conversion condition; and

a step of synthesizing the modified density component data with the color component data, thereby creating the output image data for obtaining the reproduced image.

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Claim 3 (Previously Presented): The image processing method according to claim 1 or 2, wherein the density conversion condition is determined based on a characteristic value of the image expressed by the digital image data.

Claim 4 (Currently Amended): The image processing method according to claim 3, wherein the characteristic value of the image is a mean value of densities of the digital image data.

Claim 5 (Previously Presented): The image processing method according to claim 3, wherein the characteristic value is a weighted mean value based on a weight coefficient determined by a color in each pixel of the digital image data.

Claim 6 (Previously Presented): The image processing method according to claim 1 or 2, further comprising the step of inputting a predetermined value, and wherein the gradation conversion condition is so determined as to harden or soften a tone of the image expressed by the digital image data based on the predetermined value.

Claim 7 (Previously Presented): The image processing method according to claim 1 or 2, further comprising the steps of displaying the image expressed by the digital image data on a display means and inputting an instruction from outside based on the displayed image, and wherein the density conversion condition is determined by the instruction inputted from outside based on the displayed image.

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Claim 8 (Previously Presented): The image processing method according to claim 1 or 2, wherein the gradation conversion condition is determined so that a brightest area of the reproduced image becomes white or comes to have a density approximate to the white.

Claim 9 (Previously Presented): The image processing method according to claim 1 or 2, wherein the gradation conversion condition has a lower limit value thereof.

Claim 10 (Currently Amended): An image processing apparatus for creating output image data for obtaining a reproduced image by executing image processing on digital image data obtained by a digital camera, comprising:

density conversion condition determining means for determining a density conversion condition for an image expressed by the digital image data, the density conversion condition being a first conversion function for density correction between the digital image data and the output image data to increase or decrease a density of a whole image by a predetermined value;

gradation conversion condition determining means for determining a gradation conversion condition for the image expressed by the digital image data on the basis of the density conversion condition, ~~the density conversion condition being a first conversion function for density correction between the digital image data and the output image data~~ the gradation conversion condition being a second conversion function for the density correction and gradation correction between the digital image data and the output image data to control gradations in a predetermined range of the density of the image; and

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image data converting means for creating the output image data for obtaining the reproduced image by modifying the digital image data on the basis of the density conversion condition and the gradation conversion condition, ~~and the gradation conversion condition being a second conversion function for the density correction and gradation correction between the digital image data and the output image data.~~

Claim 11 (Currently Amended): An image processing apparatus for creating output image data for obtaining a reproduced image by executing image processing on digital image data obtained by a digital camera, comprising:

data separating means for separating the digital image data into density component data and color component data;

density conversion condition determining means for determining a density conversion condition for converting a density of the density component data, the density conversion condition being a first conversion function for density correction between the density component data and a modified density component data to increase or decrease a density of a whole image by a predetermined value;

gradation conversion condition determining means for determining a gradation conversion condition for converting a gradation of the digital image data on the basis of the density conversion condition, the gradation conversion condition being a second conversion function for the density correction and gradation correction between the density component data and the modified density component data to control gradations in a predetermined range of the density of the image;

data converting means for modifying the density component data in accordance with the density conversion condition and the gradation conversion condition; and

data synthesizing means for synthesizing the modified density component data with the color component data, thereby creating the output image data for obtaining the reproduced image.

Claim 12 (Previously Presented): The image processing apparatus according to claim 10 or 11, wherein said density conversion condition determining means determines the density conversion condition on the basis of a characteristic value of the image expressed by the digital image data.

Claim 13 (Previously Presented): The image processing apparatus according to claim 12, wherein the characteristic value of the image is a mean value of densities of the digital image data.

Claim 14 (Previously Presented): The image processing apparatus according to claim 12, wherein the characteristic value is a weighted mean value based on a weight coefficient determined by a color in each pixel of the digital image data.

Claim 15 (Previously Presented): The image processing apparatus according to claim 10 or 11, further provided with means for inputting a predetermined value, and wherein the gradation conversion condition is so determined as to harden or soften a tone of the image expressed by the digital image data based on the predetermined value.

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Claim 16 (Previously Presented): The image processing apparatus according to claim 10 or 11, further comprising a display means for displaying the image expressed by the digital image data, and input means for inputting an instruction from outside based on the displayed image, and wherein said density conversion condition determining means determines the density conversion condition by the instruction inputted from outside on the basis of the displayed image.

Claim 17 (Previously Presented): The image processing apparatus according to claim 10 or 11, wherein said gradation conversion condition determining means determines the gradation conversion condition so that a brightest area of the reproduced image becomes white or comes to have a density approximate to the white.

Claim 18 (Previously Presented): The image processing apparatus according to claim 10 or 11, wherein the gradation conversion condition determining means provides the gradation conversion condition with a lower limit value.

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Claim 19 (Previously Presented): An image processing method of creating a reproduced image by executing image processing on digital image data obtained by a digital camera, comprising the steps of:

- calculating a mean value of the digital image data;
- calculating an output AIM value of processed pieces of image data;
- determining a modification value for modifying the digital image data using the calculated mean value and the calculated output AIM value;
- creating a first conversion table for converting the digital image data using the modification value;
- creating a second conversion table for modifying the first conversion table; and
- generating processed image data by converting the digital image data using the second conversion table, thereby creating the reproduced image.

Claim 20 (Previously Presented): The image processing method of claim 19, further comprising the step of classifying a pixel of the image data into one of a plurality of regions in a system of coordinates wherein a first axis of coordinates corresponds to a first color difference between a first color component and a second color component of the pixel, and a second axis of coordinates corresponds to a second color difference between the second color component and a third color component of the pixel, wherein the step of calculating the mean value includes multiplying the pixel with a weight value that depends on the region into which the pixel is classified.

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Claim 21 (Previously Presented): The image processing method of claim 20, wherein the plurality of regions includes a first region in a vicinity of an origin of the system of coordinates, a second region extending outside of the first region, and a third outermost region.

Claim 22 (Previously Presented): The image processing method of claim 21, wherein the weight value is 1.0 in the first region, 0.5 in the second region and 0 in the third region.

Claim 23 (Previously Presented): The image processing method of claim 21, wherein the weight value is proportional to a distance from the origin of the system of coordinates.

Claim 24 (Previously Presented): The image processing method of claim 20, wherein the weight value is 1.0 in a first region, 0.5 in a second region and 0 in a third region.

Claim 25 (Previously Presented): The image processing method of claim 20, wherein the weight value depends on a lightness of the digital image data, the weight value being smaller when the lightness of the image data is larger.

Claim 26 (Previously Presented): The image processing method of claim 19, further comprising the step of classifying pixels of the image data into a background

image area and a principal image area, wherein the mean value is calculated using the pixels within the principal image area.

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Claim 27 (Previously Presented): The image processing method of claim 26, wherein the background image area is a neutral color image area over an highlight image area of a predetermined size wherein a difference between pixel values is small.

Claim 28 (Previously Presented): The image processing method of claim 19, further comprising the step of, prior to calculating the mean value, generating a rough image data by thinning out pixels of the digital image data, wherein the mean value is calculated using the pixels within the rough image data.

Claim 29 (Previously Presented): The image processing method of claim 19, wherein the modification value is a ratio of the mean value and the output AIM value.

Claim 30 (Previously Presented): The image processing method of claim 19, wherein the modification value is a difference between the mean value and an offset of the output AIM value, wherein the offset of the output AIM value is calculated by subtracting a constant value from the output AIM value.

Claim 31 (Previously Presented): The image processing method of claim 19, wherein the modification value is a ratio of the mean value and the output AIM value, wherein the ratio is weighted by a constant value.

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Claim 32 (Previously Presented): The image processing method of claim 19, wherein the first conversion table converts the digital image data into a modified image data of lower value than that of the digital image data, thereby decreasing a density of the digital image data when the digital image data corresponds to an overexposure, and the first conversion table converts the digital image data into a modified image data of higher value than that of the digital image data, thereby decreasing the density of the digital image data when the digital image data is a contrejour scene.

Claim 33 (Previously Presented): The image processing method according to claim 1 or 2, wherein the density conversion condition is a density conversion table for the density correction, and the gradation conversion condition is a gradation conversion table for the density correction and the gradation correction.

Claim 34 (Previously Presented): The image processing apparatus according to claim 10 or 11, wherein the density conversion condition is a density conversion table for the density correction, and the gradation conversion condition is a gradation conversion table for the density correction and the gradation correction.

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Claim 35 (Currently Amended): The image processing method according to claim 1, wherein the gradation conversion condition is a conversion function such that, when a density of modified image expressed by modified image data obtained by modifying the digital image data based on the density conversion condition becomes larger than a predetermined density, a tone of image data of highlight ~~condition is a conversion function such that, when~~ a side of the modified image data is hardened, and when the density of the modified image becomes smaller than a predetermined density, the tone of the image data of the highlight side of the modified image data is softened.

Claim 36 (Previously Presented): The image processing method according to claim 2, wherein the gradation conversion condition is a conversion function such that, when a density of modified image expressed by modified image density data obtained by modifying the density component data based on the density conversion condition becomes larger than a predetermined density, a tone of image data of highlight side of the modified image density data is hardened, and when the density of the modified image becomes smaller than a predetermined density, the tone of the image data of the highlight side of the modified image density data is softened.

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Claim 37 (Previously Presented): The image processing apparatus according to claim 10, wherein the gradation conversion condition is a conversion function such that, when a density of modified image expressed by modified image data obtained by modifying the digital image data based on the density conversion condition becomes larger than a predetermined density, a tone of image data of highlight side of the modified image data is hardened, and when the density of the modified image becomes smaller than a predetermined density, the tone of the image data of the highlight side of the modified image data is softened.

Claim 38 (Previously Presented): The image processing apparatus according to claim 11, wherein the gradation conversion condition is a conversion function such that, when a density of modified image expressed by modified image density data obtained by modifying the density component data based on the density conversion condition becomes larger than a predetermined density, a tone of image data of highlight side of the modified image density data is hardened, and when the density of the modified image becomes smaller than a predetermined density, the tone of the image data of the highlight side of the modified image density data is softened.
